

WE CLAIM:

1 1. A drive circuit for driving a display device comprising electro-optical material
2 disposed between a common electrode and an array of pixel electrodes, said drive circuit
3 comprising:
4 pixel drive circuits connected to respective ones of the pixel electrodes and
5 operable to generate respective pixel drive signals alternating between a first high voltage and
6 a first low voltage differing in voltage by less than or equal to a process-limited maximum;
7 and
8 a common drive circuit connected to the common electrode and operable to
9 generate a common drive signal alternating between a second high voltage and a second low
10 voltage differing in voltage by more than the process-limited maximum, the common drive
11 signal being asymmetrically bipolar with respect to the first low voltage.

1 2. The drive circuit of Claim 1, wherein the first low voltage and the second low
2 voltage differ in voltage by less than or equal to a threshold voltage at which an electro-
3 optical response is produced by the electro-optical material.

1 3. The drive circuit of Claim 2, wherein the first high voltage and the second
2 high voltage differ in voltage by less than or equal to the threshold voltage.

1 4. The drive circuit of Claim 1, wherein the common drive signal is substantially
2 periodic between the second low voltage and the second high voltage.

1 5. The drive circuit of Claim 1, wherein the first low voltage is 0 volts and the
2 first high voltage is 1.8 volts.

1 6. The drive circuit of Claim 5, wherein the second low voltage is -1.0 volts and
2 the second high voltage is 2.8 volts.

1 7. The drive circuit of Claim 1, wherein said pixel drive circuits are located on a
2 substrate of the display device including the array of pixel electrodes, said pixel drive circuits
3 underlying respective ones of the pixel electrodes.

1 8. The drive circuit of Claim 7, wherein said common drive circuit is located on
2 the substrate.

1 9. The drive circuit of Claim 8, wherein said common drive circuit includes a
2 transistor of a size greater than or equal to 350 nm.

1 10. The drive circuit of Claim 7, wherein said common drive circuit is located
2 external to the substrate.

1 11. The drive circuit of Claim 10, wherein the substrate includes a timing circuit
2 connected to said common drive circuit to control the timing of the common drive signal.

1 12. The drive circuit of Claim 11, wherein the timing circuit alternates between
2 the first low voltage and the first high voltage, said common drive circuit converting the first
3 low voltage to the second low voltage and the first high voltage to the second high voltage.

1 13. The drive circuit of Claim 7, wherein the process-limited maximum is the
2 breakdown voltage of said pixel drive circuits.

1 14. The drive circuit of Claim 1, wherein at least one of said pixel drive circuits
2 and said common drive circuit is further operable to vary the phase relationship between the
3 respective pixel drive signals and the common drive signal.

1 15. The drive circuit of Claim 1, wherein said pixel drive circuits each include a
2 transistor of a size less than or equal to 180 nm.

1 16. The drive circuit of Claim 14, wherein the process-limited maximum is less
2 than or equal to 1.8 volts.

1 17. A method for driving a display device comprising electro-optical material
2 disposed between a common electrode and an array of pixel electrodes, said method
3 comprising:

4 driving each of the pixel electrodes with a respective pixel drive signal
5 alternating between a first high voltage and a first low voltage differing in voltage by less
6 than or equal to a process-limited maximum; and

7 driving the common electrode with a common drive signal alternating between
8 a second high voltage and a second low voltage differing in voltage by more than the process-
9 limited maximum, the common drive signal being asymmetrically bipolar with respect to the
10 first low voltage.

1 18. The method of Claim 17, further comprising:
2 determining a threshold voltage at which an electro-optical response is
3 produced by the electro-optical material; and
4 setting the first low voltage and the second low voltage to differ in voltage by
5 less than or equal to the threshold voltage and the first high voltage and the second high
6 voltage to differ in voltage by less than or equal to the threshold voltage.

1 19. The method of Claim 17, wherein said driving the common electrode includes
2 generating the common drive signal substantially periodic between the second low voltage
3 and the second high voltage.

1 20. The method of Claim 17, wherein said driving the common electrode includes
2 generating the common drive signal on a substrate of the display device, the substrate
3 including the array of pixel electrodes.

1 21. The method of Claim 17, wherein said driving the common electrode further
2 includes generating the common drive signal external to a substrate of the display device, the
3 substrate including the array of pixel electrodes.

1 22. The method of Claim 21, wherein said generating the common drive signal
2 further includes generating a timing signal on the substrate to control the timing of the
3 common drive signal.

1 23. The method of Claim 22, wherein said generating the timing signal further
2 includes alternating the timing signal between the first low voltage and the first high voltage,
3 said driving the common electrode further comprising converting the first low voltage to the
4 second low voltage and the first high voltage to the second high voltage.

1 24. The method of Claim 17, further comprising:
2 varying phase relations between the respective pixel drive signals and the
3 common drive signal.